

Middle Grades Education and High School Graduation Requirements

February 28, 2007

Background Information

HSP-N-004 specifies that mathematics courses taken to meet North Carolina requirements for high school graduation must be completed during grades 9-12.

In North Carolina, students may complete high school courses in middle school. If a middle school student completes a high school course that requires an End of Course (EOC) test, the student must take the EOC for that course. The course appears on the high school transcript, but the student is required to complete the same number of courses toward high school graduation as the student not taking high school courses in the middle grades.

More Rigorous Content in Middle Grades

Research supports more rigorous content at the middle grades. Three current documents summarize international and national trends in mathematics:

Research Study	Summary
Schmidt, W. H., Wang, H. C., & McKnight, C. (2005). <i>Curriculum coherence: an examination of US mathematics and science content standards from an international perspective.</i> Journal of Curriculum Studies, 37(5), 525-559.	<i>This article is an example of many analyses of the TIMSS data that make a case for a more coherent and rigorous mathematics curriculum, especially in grades K-8. Note that most countries in the TIMSS begin secondary mathematics topics in grade 7 and the curriculum is an integrated sequence of topics. This is in contrast to the common curriculum sequence in the United States of 7th and 8th grade mathematics followed by discrete courses in Algebra I, Geometry, Algebra II, and higher levels of mathematics.</i>
Newton, J., Larnell, G., & Lappan, G. (2006). <i>Analysis of K-8 Algebra Grade-Level Learning Expectations.</i> In B. Reys (Ed.), <i>The intended mathematics curriculum as represented in state-level curriculum standards : consensus or confusion?</i> (pp. 59-87). Greenwich, CT: Information Age Pub. Inc.	<i>This report summarizes a cross-state analysis of middle grades mathematics standards in the strand of algebra. According to the report, there is some agreement across the United States regarding which topics should be taught but little consensus regarding grade level placement of topics that should be taught. These findings concur with the TIMSS data mentioned in the Schmidt article.</i>
National Council of Teachers of Mathematics. (2006). <i>Curriculum focal points for prekindergarten through grade 8 mathematics: a quest for coherence.</i> Reston, VA: The National Council of Teachers of Mathematics.	<i>This publication of the National Council of Teachers of Mathematics (NCTM) suggests focus areas for K-8 Mathematics standards.</i>

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Algebra I & Middle Grades

The 2003 revision of the *North Carolina Standard Course of Study for Mathematics* (Grades 6, 7, and 8) contains many of the objectives that were formerly in the 1998 revision of the *North Carolina Standard Course of Study for Mathematics*. In other words, North Carolina’s current standards for middle grades mathematics are much more rigorous than they were prior to 2003. Approximately 60% of the 1998 Algebra I objectives were transitioned into the 2003 Middle Grades objectives.

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Policies in other States

An informal survey of other states’ policies regarding students taking high school courses (specifically Algebra I) in middle grades was conducted by reviewing websites and email queries to other State Agency staff.

What Other States Are Doing With High School Math Courses Taken Before Grade 9?			
State	High School Math/Alg.1 before Grade 9?	High School Graduation Credit Awarded?	Comments
CA	Yes	Yes	<ul style="list-style-type: none"> •Students must complete 2 years of mathematics in grades 9-12.
DE	Yes	Yes	<ul style="list-style-type: none"> •Currently 3 math credits are required for graduation with at least 2 of the three being taken in grades 9-12. •4 credits will be required effective with the class of 2011. 4 credits will be required effective with the class of 2011. •Current 8th graders will be required to take a math class their senior year.
GA	Local Decision	Local Decision	<ul style="list-style-type: none"> •Students must take 4 years of mathematics in high school.
IN	Yes	Local Decision	<ul style="list-style-type: none"> •For the general diploma, students have to earn at least 4 credits in grades 9-12. •For the honors diploma, students have to take at least one year of math or physics in their last two years of high school.
KY	Yes	Yes	<p>Currently</p> <ul style="list-style-type: none"> •The teacher must be certified in math to give high school credit. If credit is given, it can be one of the three credits to graduate. •The student must demonstrate mastery of the middle level content as specified in the Program of Studies. The district must have placement criteria in place. <p>The following amendments are proposed for the graduating class of 2012:</p>

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What Other States Are Doing With High School Math Courses Taken Before Grade 9?			
State	High School Math/Alg.1 before Grade 9?	High School Graduation Credit Awarded?	Comments
			<ul style="list-style-type: none"> •High schools must accept credit toward high school graduation for high school coursework taken by students in grade 5, 6, 7, or 8. • Students must take mathematics every year in grades 9-12.
LA	Yes	Yes	<ul style="list-style-type: none"> •Students receive graduation credit if the teacher is certified to teach high school math. If not, students must take a state End-Of-Course exam.
MA	Local Decision	Local Decision	
ME	Local Decision	Local Decision	
MI	Yes	Yes	<ul style="list-style-type: none"> •"Testing Out" is an option to demonstrate that a student meets or exceeds the content expectations associated with the subject credit area and the earned credit counts as a required credit for graduation and reduces the number of credits required.
MO	Yes	Yes	
NY	Yes	Yes	<ul style="list-style-type: none"> •District staff decides whether a student has demonstrated readiness to begin high school courses in the 8th grade. •Students may receive up to 6.5 credits toward graduation without taking the courses with staff determination, a score of at least 85% on the state examination, and meeting other school requirements such as labs, special projects, or oral examinations.
OH	Yes	Yes	
OK	Yes	Yes	<ul style="list-style-type: none"> •Graduation credit is not received if the course is taken prior to Grade 7. •Effective with this year's 7th graders, students must have three years of mathematics between grades 9-12.
SC	Yes	Yes	
TX	Yes	Yes	<ul style="list-style-type: none"> •Students may receive credit-by-examination and there is no limit to the number of course credits students may earn by credit-by-examination. •While students may take and pass a high school level course in 8th grade and retake it in high school, both grades are recorded but the district determines which grade will receive graduation credit.
VA	Yes	Yes	
WA	Yes	Yes	<ul style="list-style-type: none"> •If requested by the student and his/her family, a student who has completed high school courses before attending high school shall be given high school credit which shall be applied to fulfilling high school graduation requirements.

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Issues

The following are two of the most critical issues relating to students taking a high school Algebra I course in middle school:

Readiness/Placement into Algebra I

Any middle grades student who enrolls in Algebra I must be adequately prepared for success, including demonstrated mastery of the current standards for Grade 8 mathematics. The prerequisite skills for Algebra I as outlined in the *North Carolina Standard Course of Study* for Mathematics adopted by the State Board of Education in 2003 are as follows:

- Operate with the real numbers to solve problems.
- Find, identify, and interpret the slope and intercepts of a linear relation.
- Visually determine a line of best fit for a given scatterplot; explain the meaning of the line; and make predictions using the line.
- Collect, organize, analyze, and display data to solve problems.
- Apply the Pythagorean Theorem to solve problems.

Each of these prerequisite skills is found in the middle grades mathematics standard course of study. In particular, each of these is addressed in the 8th grade year.

A Case for four years of mathematics during high school years

A report by Adelman (2006) makes the case that most students should complete four years of mathematics during high school with the minimum completion being one mathematics course beyond Algebra II (or Integrated Mathematics III). [Adelman, C. (2006). THE TOOLBOX REVISITED Paths to Degree Completion from High School Through College. Retrieved 11/4/06, from

<http://www.ed.gov/rschstat/research/pubs/toolboxrevisit/toolbox.pdf>

Recommendation

The following amendment is recommended for HSP-N-004:

- (e) In addition to the requirements of Paragraph (a), students must successfully complete 20 course units in grades 9-12.

Students who pass courses during grades 6-8 that are described in the *North Carolina Standard Course of Study for Grades 9-12* must achieve level 3 or 4 on an EOC, if available, in order to be given credit for meeting that high school graduation requirement.

High school courses taken in grades 6-8 which do not have an EOC must use high school course codes, must be aligned to the *North Carolina Standard Course of Study for Grades 9-12*, and will be subject to review.

Students must complete at least one unit of mathematics credit in their senior year. The 20 course units in grades 9-12 are specified below.
